

A b s t r a c t

A Method for identifying one or a small number of molecules, especially in a dilution of  $\leq 1 \mu\text{M}$ , using laser excited FCS with measuring times  $\leq 500$  ms and short diffusion paths of the molecules to be analyzed, wherein the measurement is performed in small volume units of preferably  $\leq 10^{-14}$  l, by determining material-specific parameters which are determined by luminescence measurements of molecules to be examined.

The device which can be preferably used for performing the method according to the invention is a per se known system of microscope optics for laser focusing for fluorescence excitation in a small measuring compartment of a very diluted solution and for imaging the emitted light in the subsequent measurement through confocal imaging wherein at least one system of optics with high numerical aperture of preferably  $\geq 1.2$  N.A. is employed, the light quantity is limited by a confocally arranged pin-hole aperture in the object plane behind the microscope objective, and the measuring compartment is positioned at a distance of between 0 and 1000  $\mu\text{m}$  from the observation objective.